Translation

PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| Applicant's or agent's file reference S48X2-5 | FOR FURTHER ACTION | SeeNotificationofTransmittalofInternational Preliminary Examination Report (Form PCT/IPEA/416) |
|---|---|---|
| International application No. PCT/JP02/07598 | International filing date (*day/month/year*) 26 July 2002 (26.07.02) | Priority date (*day/month/year*) 21 January 2002 (21.01.02) |
| International Patent Classification (IPC) or national classification and IPC B01J 35/02, 35/06, 37/02, 21/06, B01D 53/86 | | |
| Applicant SUMITOMO TITANIUM CORPORATION | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

| Date of submission of the demand | Date of completion of this report |
|---|---|
| 20 March 2003 (20.03.03) | 22 July 2003 (22.07.2003) |
| Name and mailing address of the IPEA/JP<br><br>Facsimile No. | Authorized officer<br><br>Telephone No. |

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP02/07598

## I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-21, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the claims:

pages 12, 13, 15-25, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages 1, 3-11, 14, 26, filed with the letter of 03 July 2003 (03.07.2003)

☒ the drawings:

pages 1-7, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☒ the claims, Nos. 2, 27

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | 1, 3-13, 24-26 | YES |
| | Claims | 14-23 | NO |
| Inventive step (IS) | Claims | | YES |
| | Claims | 1, 3-26 | NO |
| Industrial applicability (IA) | Claims | 1, 3-26 | YES |
| | Claims | | NO |

2. Citations and explanations

Document 1: JP 9-947 A (Mitsubishi Rayon Co., Ltd.), 07 January 1997

Document 2: JP 6-320010 A (Nippon Muki Co., Ltd.), 22 November 1994

Document 3: JP 2001-333966 A (Matsushita Electric Works, Ltd.), 04 December 2001

Document 4: JP 11-512337 A (Saint Gobain Vitrage), 26 October 1999

Document 5: JP 2001-335343 A (Central Glass Co., Ltd.), 04 December 2001

Document 6: JP 2000-72575 A (Inax Corp.), 07 March 2000

Document 7: WO 98/58736 A (Sumitomo Metal Industries, Ltd.), 30 December 1998

1) The invention set forth in claims 14-23 lacks novelty in the light of document 6 cited in the international search report.

Document 6 discloses a method wherein a base tile material is heated to 200°C, titanium tetrachloride and water vapor are brought into contact with the tile at a temperature between 150-250°C to form a vapor-deposited film of titanium oxide upon the surface of the tile, and the tile is sintered at a temperature between 500-900°C in order to produce a crystalline titanium oxide film (refer

to comparative example 3). Furthermore, document 6 discloses the feature of adding silicon tetrachloride to the source material vapor.

2) The inventions set forth in claims 1, 3, 5-7, 9, 11-13 and 26 lack novelty in the light of documents 1, 2, 4 and 6 cited in the international search report.

Document 1 discloses a photocatalytic complex wherein titanium oxide is vapor-deposited upon the surface of a quartz optical fiber in order to form a continuous film, and discloses the feature of using this complex for environmental cleanup.

Document 2 discloses a photocatalytic complex wherein a film of titanium oxide is coated upon the fiber surfaces of a woven cloth that comprises glass fibers, and discloses the feature of using this complex for environmental cleanup.

Document 4 discloses a photocatalytic complex wherein a film of crystalline titanium oxide having an average crystal diameter of 10-40nm, which is formed by vapor-depositing a source material such as titanium tetrachloride, is coated upon the surface of a glass or ceramic base material, and discloses the feature of using this complex for environmental cleanup.

Document 6 discloses a photocatalytic complex wherein a film of crystalline titanium oxide, which is formed by vapor-depositing a titanium tetrachloride source material, is coated upon the surface of a tile base material, discloses a method wherein titanium tetrachloride and water vapor are brought into contact with the tile to form a vapor-deposited film of titanium oxide upon the surface of the tile and then the tile is sintered at a temperature between 500-900°C in order to produce a crystalline titanium oxide film, and discloses the feature of using the abovementioned photocatalytic

complex for environmental cleanup. Furthermore, document 6 also discloses the features of adding silicon oxide to the titanium oxide and of doping with an oxide of a transitional metal.

Therefore, it is considered to be easy for a person skilled in the art to produce a photocatalytic complex coated with a film of crystalline titanium oxide, which has an average crystal diameter of 50nm or less, by subjecting the inorganic glass fibers or the like, which are disclosed in documents 1 and 2, to chemical vapor deposition using titanium tetrachloride as disclosed in documents 4-6.

3) The invention set forth in claims 4 and 8 does not involve an inventive step in the light of documents 1-4 and 6 cited in the international search report.

Document 3 discloses the features of vapor-depositing titanium oxide upon a non-woven cloth, and of mixing zinc oxide or the like into the titanium oxide; therefore, there does not appear to be any special difficulty in using a non-woven cloth or mixing zinc oxide or the like into the titanium oxide in the photocatalytic complexes disclosed in documents 1 and 2.

4) The inventions set forth in claims 10, 24 and 25 do not involve an inventive step in the light of documents 1-4, 6 and 7 cited in the international search report.

Document 7 discloses the feature of coloring the photocatalytic film of titanium oxide by adding a coloring pigment; therefore, there is not considered to be any special difficulty in configuring this feature.